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last stations the apothecia are less developed than in the San Clemente specimen; the spores in both insular plants are alike.

BUELLIA INQUILINA Tuck. Apothecia apparently parasitic upon the thallus of *Lecanora saxicola* (Poll.) Ach., occupying the central part of the host lichen, the color of which is changed to a sordid grayish brown, while the peripheral unoccupied lobes retain their normal color. The apothecia are sessile, solitary or, mostly, grouped and contiguous on a squamule, from 0.3 to 0.75 mm. wide; disk flat to slightly convex, slightly papillate, black, the medium thick margin also black with a slight brownish tinge; epithecium subcontinuous, of the color of Van Dyke brown; thecium colorless, 60μ to 64μ high; paraphyses loose or free with globular tips; asci clavate and inflated clavate; spores 8, brown, bilocular, ovoid-ellipsoid, both ends rounded, each locus with a round spot, slightly constricted, 12μ to 16μ long, 7μ to 9μ thick; hypothecium concolorous with the epithecium; hymenial gelatine with iodine deep blue, the asci changing to a dark copper-red, the tops of some asci remaining blue; no change with KHO. Not having an authentic specimen for comparison, the above name of Tuckerman (Syn. 2: 105) is given provisionally, the spore measurements agreeing well with the description.

On Quartz near Eden Hot Springs, Riverside County.

ARTHOPYRENIA BIFORMIS (Borr.) Muell. Arg.

Verrucaria biformis Borrer.

Thallus silvery gray, finely squamulose-pulverulent, diffuse; apothecia scattered, prominent, semiglobular or somewhat subconical, perithecium dull black or shining, ostiole minute, punctiform depressed; paraphyses free, slender, distantly branching; asci cylindric, 100μ long, 12μ thick, eight-spored; spores ellipsoid, bilocular, colorless, 12μ to 17μ long, 7μ to 8μ thick, the partition often oblique, dividing the spore unsymmetrically; hypothecium pallid. Iodine does not stain the ascus membrane, but its contents become vinous red, the thecium and paraphyses yellow.

Catalina Island on *Heteromeles arbutifolia* (Poir.) Roem.

Determined by Dr. A. Zahlbruckner.

REVIEWS

LEOPOLD LOESKE: Studies in the Comparative Morphology and the Phylogenetic Taxonomy of Mosses. Berlin, 1910*

In German. A profoundly interesting treatise of 222 pages, with a Foreword, an Introduction, 37 meaty chapters, and a Concluding Word: all replete with suggestions, largely based on years of field observations, illuminating the phyletic relations of mosses. The author proceeds in all his discussions with refreshing courage and independence of judgment. Servility is foreign to Dr. Loeske's nature. The criticisms and strictures he makes on current moss systems and their authors show him a worthy and able, but also a courteous and

* See 3rd Cover.

cautious, debater in the arena of scientific discussion. On occasion he can be blunt: e. g. when he criticises G. Roth's "Die Europaeischen Laubmoose."

The author's Introduction, alone, is a classic. Covering thirty pages, it is more than merely an introduction; it is a learned review of existing moss systems, and a discussion of the basis of each view point, laying bare the foibles and weak points of all; it is also a clear pointer in the direction of intelligent improvement. He here shows the importance, in elaborating a system, of attaching equal importance to gametophyte and sporophyte. He brings to bear upon the problems of relationship all past and current results of microscopic and physiological study. He does more; he shows the importance of studying mosses continuously in their living conditions in the field, season after season, in order to discover the influence of changing conditions of light and moisture upon the various structures of the moss plant. In the body of the book numerous instances are cited of the discovery of relationship, or even identity, of species, especially of *Sphagna* and aquatic *Hypna*.

Each of the 37 chapters is a rounded discussion of a moss group, a unit by itself. It is unfortunate that the author disdained all headings; these and brief analytical outlines, for chapters, would make the work more easy to use in study and reference. As it is, the only convenience is an alphabetical list of the genera and families of mosses discussed in the work, some 150 in number, with page references. It would be well worth while to prepare also an alphabetical reference list of all the bryological authorities referred to in these treatises, which show Dr. Loeske an exceptionally well informed student who deserves universal respect and consideration.

The following passage translated from the Closing Word, shows fairly well the author's viewpoint in this work. Says the author, page 219:

"More than ever does systematic bryology need to be lifted above the still prevailing stage, of the mere description of forms,—that (ancient) method which is recognized by its fond appreciation of 'good' species, and in which the 'bad' species, transitional forms and similar things are valued and represented as 'inconvenient for systematic purposes' (as is the case even in Limpricht), which sounds almost as if the external finish of the systematic palace were the chief thing. This trait, an heirloom from the times of 'absolute species' conceptions, has for a long time after Darwin seriously jeopardized the progressive development of systematic bryology. In the interests of 'types,' forms have been disregarded more than was right, barring, however, certain 'excellent varieties.' But even where forms were described, they were preferably disposed of as 'forms' of the type. It is to just such matters that unequally greater attention will need to be devoted (a course not to be confused with the uncritical making of varieties). And, next to the morphology and phylogeny of a form, its biology also is always to be taken into consideration. The growing insight into mosses in all directions will necessarily advance the progressive development of systematic bryology beyond the boundaries set heretofore in large measure by morphological considerations, in order that the herbarium odor may be lost, and that a little more of the life of the moss world may be mirrored in it."

It is impossible, in a brief review, to show up adequately the multitude

of keen arguments and excellent judgments found on every page of the book, which make it most stimulating and helpful. In his discussions he leans toward Fleischer more than toward any other contemporary; in fact he honors him with the designation of teacher. He does not suppose for a moment that all his expositions will be uniformly accepted. But he expresses the fair hope that he has been able to indicate in his fundamental view points right directions for further development of systematic bryology.

Why he did not follow up his multitude of conclusions with the presentations of a moss system of his own, he explains in the following closing quotation

"The purpose of setting forth, simultaneously with my expositions, my own closed system of European mosses, I have given up as premature. At several places there would remain gaps; at other places the composition (Zuordnung) of several groups would have to be set down with question marks. Instead of setting up a ready made system, in which further investigations might make necessary rearrangements even in the near future, I therefore prefer to leave the entire matter for the present in a state of flux, and meanwhile to seek further light among extra-European mosses."

JOHN M. HOLZINGER, Winona, Minn.

LEOPOLD LOESKE: Revision einiger Amblystegien aus der Herbare Limpricht. (Ungarischen Botanischen Blaetter. Jahrg. 1911. No. 8-10. pp. 272-7.)

The author's studies were mainly confined to the specimens of *Amblystegium leptophyllum*, *A. rigescens*, *A. trichopodium*, and *A. Hausmannii*, preserved in the Limpricht herbarium at Budapest, but comparisons were made with authentic specimens and original collections from the herbaria of Juratzka and Blandow.

The following conclusions are drawn. The specimen from Travemuende mentioned by Warnstorff in the Kryptogamenflora der Mark Brandenburg as *Leptodictyum trichopodium* (Schultz) Warnst. is in part *A. compactum*. *A. trichopodium*, *Kochii*, and *curvipes* belong to the same group of forms, the first being separable only as a subspecies at most. *A. Hausmannii* is only a form of *A. leptophyllum*, and the latter a small, xerophilous form of *A. riparium*. There is no difference between *A. Juratzkanum* and *A. radicale* (P. B.) Mitt. (*sensu* Limpr.). The type material of *A. rigescens* shows this to be a depauperate form of *A. serpens*. The material representing *A. hygrophilum* in Limpricht's herbarium seems to contain several different forms, and at present it is impossible to draw conclusions regarding this species.

Students of the perplexing subject of the American forms of *Amblystegium* will find much of interest in this paper, especially in the descriptive notes. Herr Loeske promises further notes as the result of studies now in progress.

EDWARD B. CHAMBERLAIN.